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Docket No.: **PHB-34.200**

In Re Application Of: **Morris et al.**

Serial No.	Filing Date	Examiner	Group Art Unit
09/172,435	**10/14/98**	**Po Lin Chieu**	**2615**

Invention: **ENCODED VIDEO IMAGE FORMATTING**

TO THE COMMISSIONER FOR PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed on **September 4, 2003**

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DOCKET NO.: PHB-34.200

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: **Morris *et al.***

Examiner: **Po Lin Chieu**

Serial No.: **09/172,435**

Art Unit: **2615**

Filed: **10/14/98**

For: **ENCODED VIDEO IMAGE FORMATTING**

Commissioner For Patents
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BRIEF OF APPELLANTS

This Appeal Brief, pursuant to the Notice of Appeal filed September 4, 2003, is an appeal from the rejection of the Examiner dated June 4, 2003.

REAL PARTY IN INTEREST

U. S. Philips Corporation is the real party in interest.

RELATED APPEALS AND INTERFERENCES

None.

STATUS OF CLAIMS

Claims 1, 4-7, and 9-22 are currently pending.

STATUS OF AMENDMENTS

There are no After-Final Amendments which have not been entered.

SUMMARY OF INVENTION

The present invention discloses a method for formatting a sequence of video images. Successive images of the sequence are encoded according to a predetermined coding scheme in which some images of the sequence are intra-coded, without reference to any other image of the sequence, and the remainder are respectively coded with reference to at least one further image of the sequence. The encoded data for each image are formatted for each image into one or a sequence of data blocks. The formatting includes formatting at least one image of the sequence into a plurality of data blocks. A data block stream formed of the data block or blocks from successive ones of the sequence of video images is outputted. See specification, page 6, lines 5-15.

The step of formatting comprises the further steps of identifying intra-coded frames and of inserting additional data blocks in the data block stream at fixed periodically repeated intervals,. Each of the additional blocks carries data identifying the relative location in the data block stream of the first or only data block in the data block stream of the closest previously formatted intra-coded image frame. See specification, page 6, lines 16-24.

Each additional data block stores further data identifying the length of the said closest previously formatted intra-coded image frame. The image frames are encoded in accordance with MPEG standards and all data blocks in the data block stream are of a common size.. See specification, page 3, lines 13-23. See specification, page 6, lines 16-24.

At least one image of the sequence may include an intra-coded image frame, a predicted image frame (P-frame), or an interpolated image frame (B-frame). See specification, page 7,

lines 5-7.

The successive images of the sequence are encoded by an encoder apparatus. See specification, page 7, line 24 - page 8, line 6.

The encoding of successive images of the sequence may be at a variable compression rate. See abstract, page 14, lines 5-7.

The present invention discloses a storage device capable of being sequentially read and carrying an encoded and formatted sequence of video image frames. Some images of the sequence are intra-coded, without reference to any other image of the sequence, and the remainder are respectively coded with reference to at least one further image of the sequence. The encoded data for the succession of image frames is formatted into a sequence of data blocks, with at least one data block per encoded image frame, with at least one image of the sequence formatted into a plurality of data blocks, and with the stored sequence of data blocks including additional data blocks. Each such additional data block identifies the storage device storage location of the first or only data block of the closest previously formatted intra-coded image frame, wherein the additional data blocks are provided at fixed periodically repeated intervals within the stored sequence of encoded image data blocks. See specification, page 3, line 24 - page 4, line 14; page 7, lines 15-23.

The storage device may carry at respective separate storage locations auxiliary data associated with respective encoded image frames and each said additional data block further carries data identifying the storage device storage See specification, page 4, lines 15-20.

The storage device may be in the form of an optical disc, wherein the additional data blocks identify the location of the first or only data block of the closest preceding intra-coded image frame in terms of the location on disc at which said data block is stored. See specification, page 4, lines 11-14.

A video image player may be configured to receive and read the sequence of data blocks from the storage device. See specification, page 8, lines 7-14.

ISSUES

1. Whether claims 1, 4-7, and 9-21 are unpatentable under 35 U.S.C. 103(a) over Kawamura et al (5,621,840).

2. Whether claim 22 is unpatentable under 35 U.S.C. 103(a) over Kawamura et al in view of Jain (5,249,053).

GROUPING OF CLAIMS

The claims are grouped as shown in Table 1.

Table 1

Group	Issue	Claims	Do Claims of Group Stand or Fall Together?
1	1	1, 4-7, 9-21	Yes
2	2	22	Yes

The claims of Group 2 do not stand and fall together with the claims of Group 1, because the claims of Group 2 pertain to Issue 2, whereas the claims of Group 2 pertain to Issue 1. Moreover, the claims of Group 2 teach the following feature not present in the claims of Group 1: "wherein said encoding comprises encoding at a variable compression rate".

ARGUMENT

Issue 1

CLAIMS 1, 4-7, AND 9-21 ARE NOT UNPATENTABLE UNDER 35 U.S.C. 103(A) AS ALLEGEDLY BEING UNPATENTABLE OVER KAWAMURA ET AL (5,621,840).

The Examiner rejected claims 1, 4-7, under 35 U.S.C. 103(a) as allegedly being unpatentable over Kawamura et al (5,621,840).

Claims 1, 6, 11, and 12

Appellants respectfully contend that claims 1, 6, 11, and 12 are not unpatentable over Kawamura, because Kawamura does not teach or suggest each and every feature of claims 1, 6, 11, and 12. For example, Kawamura does not teach or suggest the following similar features of claims 1, 6, 11, and 12:

"identifying intra-coded frames and of inserting **additional data blocks in said data block stream at fixed periodically repeated intervals**, each of said additional data blocks carrying data identifying the relative location in the data block stream of the first or only data block in the data block stream of the closest previously formatted intra-coded image frame" (claim 1);

"with the stored sequence of data blocks including additional data blocks, with each such additional data block identifying the storage device storage location of the first or only data block of the closest previously formatted intra-coded image frame, wherein **the said additional data blocks are provided at fixed periodically repeated intervals within the stored sequence of encoded image data blocks**" (claim 6);

"said means for formatting being ... configured to insert additional data blocks in said data block stream, each of said additional data blocks carrying data identifying the relative location in the data block stream of the first or only data block of the closest previously formatted intra-coded image frame, **wherein each of said additional data blocks are provided at fixed periodically repeated intervals within the stored sequence of encoded image data blocks**" (claim 11); and

"with the stored sequence of data blocks including additional data blocks, with each such additional data block identifying the storage device storage location of the first or only data block of the closest previously formatted intra-coded image frame, ... the player comprising means for selecting frames by selecting every N^{th} additional data block and displaying the respectively identified intra-coded image frame, **wherein every N^{th} additional data block is provided at fixed periodically repeated intervals**" (claim 12) (emphasis added).

The Examiner argues: "Kawamura et al also discloses inserting additional data blocks into the stream, each of the additional blocks carrying data identifying the relative location of the first or only data block of an I frame (col. 7, lines 26-37). However, Kawamura et al does not disclose that a additional data block is inserted at fixed periodically repeated intervals, wherein the additional data blocks carry data identifying the relative location in the data block stream of the first or only data block in the data block stream of the closet previously formatted intra-coded image frame. Kawamura et al teaches in the prior art that a fixed rate of compression results in the I frames occurring at predetermined positions (col. 3, lines 13-23). The additional data blocks (i.e. entry packet, fig. 10) are inserted before the video packet header for a packet of video data containing an I picture. If the compression rate is fixed the I frames will be located at predetermined positions in the video stream. Therefore, the additional data blocks (or entry packets) will be inserted at fixed periodically repeated intervals. It would have been highly desirable to have additional data blocks in the fixed compression rates so that the position of the I frame does not have to be calculated (col. 3, lines 12-23), thereby removing the need for circuitry to calculate the position of entry points and resulting in a more affordable device. Additionally, having a fixed compression rate also allows for easy prediction of the recording area needed to record a desired amount of video data."

Appellant respectfully contend that the preceding argument by the Examiner is not persuasive for at least the following reasons.

A first reason why the Examiner's argument is not persuasive is that the Examiner has come to a logically invalid conclusion reasoning that "If the compression rate is fixed the I frames will be located at predetermined positions in the video stream. Therefore, the additional

data blocks (or entry packets) will be inserted at fixed periodically repeated intervals". Appellants contend that placing the I frames at predetermined positions in the video stream does not place the I frames at fixed periodically repeated intervals and therefore does not place the additional data blocks (or entry packets) at fixed periodically repeated intervals. The phrase "fixed periodically repeated intervals" means a constant separation between successive additional data blocks in the periodic sequence of additional data blocks. For example, see Fig. 2 of the present patent application and the description thereof in the specification on page 7, lines 5-14, in which the additional data block (denoted as "I") appears with a constant separation of 25 blocks. By teaching that "a fixed rate of compression results in the I frames occurring at predetermined positions," Kawamura is merely stating, as is known to one of ordinary skill in the art, that if the position of the I frames prior to compression are predetermined and thus known, then the position of the I frames following compression are likewise predetermined and thus known, since the positions of the I frames after compression are linearly related to the positions of the I frames prior to compression by the fixed rate of compression. However, the preceding statement by Kawamura does not lead the an inference that the separation between I frames is constant when the compression rate is fixed. In other words, "predetermined positions" does not mean "fixed periodically repeated intervals". Indeed, it is highly likely that the separation between I frames in Kawamura is not constant, because B-frames and/or P frames are typically disposed between the I frames and the number of such B-frames and/or P frames is typically variable. Thus, Appellants contend that the Examiner's allegation ("Therefore, the additional data blocks (or entry packets) will be inserted at fixed periodically repeated intervals") is incorrect.

A second reason why the Examiner's argument is not persuasive is that the Examiner's argument for obviousness imposes a fixed compression rate on Kawamura's invention, which would destroy Kawamura's invention. Appellants respectfully contend that the entire fabric of

Kawamura's invention is based on the assumption of a variable compression rate. In the "Background Art" section, Kawamura discloses that the problem with the prior art is that "in the case where compression of variable rate is being carried out, position of I picture becomes indefinite. Thus, it is difficult to provide an access" (Kawamura, col. 3, lines 20-23) and "in the conventional apparatus, since the apparatus cannot recognize position (access point) of I picture, such an operation to move reproduction position to some extent thereafter to wait access point becomes necessary. For this reason, there was the problem that repetition period of search operation becomes long, so rapid (quick) search operation becomes difficult" (Kawamura, col. 3, lines 57-63). Kawamura then states the purpose of the Kawamura invention: "This invention has been made in view of such circumstances and contemplates rapidly finding out access point of video data, thus making it possible to carry out quick search at a desired speed." (Kawamura, col. 3, lines 64-67). In light of the preceding disclosure by Kawamura, Appellants contend that Kawamura's invention exists for only one purpose, namely "to carry out quick search at a desired speed" for the case of variable compression rate.

Appellants additionally cite Kawamura to further support Appellants' contention that Kawamura requires a variable compression rate. Kawamura states: "Moreover, video encoder 1 and audio encoder 2 respectively encode video signal and audio signal **at variable rates**"(emphasis added) (see Kawamura, col. 7, lines 60-61). Kawamura also states: "This invention relates to ... a data recording medium when used in the case of allowing picture data and speech data encoded **at a variable rate** to undergo time-division multiplex recording onto a disc to search a predetermined picture at a high speed" (emphasis added) (Kawamura, col. 1, 9-17). Appellants also note that Kawamura does not anywhere teach or suggest use of a fixed compression rate in the Kawamura invention.

In summary relating to the second reason why the Examiner's argument is not persuasive, Appellants contend that the Kawamura invention requires a variable compression rate and that

the Kawamura invention exists only for the purpose of solving the problem of providing quick access and high search speed when the compression rate is a variable compression rate. Appellants contend that without a variable compression rate, Kawamura's invention would be destroyed.

A third reason why the Examiner's argument is not persuasive is that the Examiner argues that it would be desirable "to have additional data blocks in the fixed compression rates so that the position of the I frame does not have to be calculated ". In response, Appellants contend that in Kawamura the position of the additional data blocks would have to be calculated instead of the I frames. In particular, Kawamura explains that "it is impossible to recognize positions of forward (future) entry packets at current time point. For this reason, at the time point of first delivering entry packet to DSM 10, data of entry packet that entry packet generating circuit 32 generates is caused to be dummy data" (Kawamura, col. 7, lines 38-42). "At the time point when algorithm of FIG. 11 is repeated and input to video encoder 1 and audio encoder 2 disappears, position information of entry packet is written into the entry packet already recorded on the disc. Namely, control section 80 reads out position of pack including entry packet from entry point memory section 33 to write relative positions of packs including respective three entry packets before and after into respective entry packets of disc of DSM 10" (Kawamura, col. 9, lines 16-23). Appellants point to the calculational steps S13 and S19 in FIG. 11.

A fourth reason why the Examiner's argument is not persuasive is that the Examiner argues: "It would have been highly desirable to have additional data blocks in the fixed compression rates so that the position of the I frame does not have to be calculated (col. 3, lines 12-23), thereby removing the need for circuitry to calculate the position of entry points and resulting in a more affordable device." In effect, the Examiner is suggesting that it is obvious to

give up the huge advantage of a substantial improvement in efficiency resulting from a variable compression rate in favor of a relatively minor expense of a trivially small amount of additional circuitry, or a trivially small amount of extra memory if software is alternatively used, to calculate the position of entry points. Appellants contend that one of ordinary skill in the art would not find it obvious to make the aforementioned tradeoff that the Examiner has impliedly suggested.

Based on the preceding arguments, Appellants respectfully maintain that claims 1, 6, 11, and 12 are not unpatentable over Kawamura, and that claims 1, 6, 11, and 12 are in condition for allowance.

Claims 4-5, 7, 9-10, and 13-21

Since claims 4-5 and 13-15 depend from claim 1, which Appellants have argued *supra* to be patentable under 35 U.S.C. §103(a), Appellants maintain that claims 4-5 and 13-15 are patentable under 35 U.S.C. §103(a).

Since claims 7, 9-10, and 16-18 depend from claim 6, which Appellants have argued *supra* to be patentable under 35 U.S.C. §103(a), Appellants maintain that claims 7, 9-10, and 16-18 are patentable under 35 U.S.C. §103(a).

Since claims 19-21 depend from claim 11, which Appellants have argued *supra* to be patentable under 35 U.S.C. §103(a), Appellants maintain that claims 19-21 are patentable under 35 U.S.C. §103(a).

Issue 2

CLAIM 22 UNDER 35 U.S.C. 103(A) IS NOT UNPATENTABLE OVER KAWAMURA ET AL IN VIEW OF JAIN (5,249,053).

The Examiner rejected claim 22 under 35 U.S.C. 103(a) over Kawamura et al in view of Jain (5,249,053).

Since claim 22 depends from claim 1, which Appellants have argued *supra* to be patentable under 35 U.S.C. §103(a), Appellants maintain that claim 22 is patentable under 35 U.S.C. §103(a).

Additionally, Appellants contend that Kawamura in view of Jain does not teach or suggest the following feature of claim 22: "wherein said encoding comprises encoding at a variable compression rate."

The Examiner argues: "Regarding claim 22, Kawamura et al does not disclose encoding at a variable compression rate. Jain teaches encoding with a variable compression rate (col. 5, lines 53-59). It would have been highly desirable to have variable compression rate so that the compression rate could be adjusted to provide the maximum compression rate while an acceptable image quality is met (col. 6, lines 7-22). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to have a variable compression rate in the device of Kawamura et al.

In response, Applicant contends that the Examiner's argument is not persuasive, because the Examiner has presented logically inconsistent arguments. The Examiner argues that a variable compression rates should be used in the device of Kawamura, as taught by Jain. However, the Examiner has previously argued, in relation to claim 1 from which claim 22 depends, that a fixed compression rate should be used in Kawamura. Therefore, the Examiner has suggested the compression rate be variable and that the compression rate be fixed in the same claim 22, which logically contradictory.

Based on the preceding argument, Appellants respectfully maintain that claim 22 is not unpatentable over Kawamura in view of Jain, and that claim 22 is are in condition for allowance.

SUMMARY

In summary, Appellants respectfully request reversal of the June 4, 2003 rejection under 35 U.S.C. §103(a) of claims 1, 4-7, and 9-22.

Respectfully submitted,

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For: **ENCODED VIDEO IMAGE FORMATTING**

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APPENDIX - CLAIMS ON APPEAL

1. A method for formatting a sequence of video images comprising the steps of:

encoding successive images of the sequence according to a predetermined coding scheme in which some images of the sequence are intra-coded, without reference to any other image of the sequence, and the remainder are respectively coded with reference to at least one further image of the sequence;

formatting the encoded data for each image into one or a sequence of data blocks and outputting a data block stream formed of the data block or blocks from successive ones of the sequence of video images, said formatting including formatting at least one image of the sequence into a plurality of data blocks;

characterised in that the step of formatting comprises the further steps of identifying intra-coded frames and of inserting additional data blocks in said data block stream at fixed periodically repeated intervals, each of said additional data blocks carrying data identifying the relative location in the data block stream of the first or only data block in the data block stream of the closest previously formatted intra-coded image frame.

4. A method as claimed in Claim 1, wherein each additional data block stores further data identifying the length of the said closest previously formatted intra-coded image frame.

5. A method as claimed in Claim 1, wherein the image frames are encoded in accordance with MPEG standards and all data blocks in the data block stream are of a common size.

6. A storage device capable of being sequential read and carrying an encoded and formatted sequence of video image frames, wherein some images of the sequence are intra-coded, without reference to any other image of the sequence, and the remainder are respectively coded with reference to at least one further image of the sequence, and the encoded data for the succession of image frames is formatted into a sequence of data blocks, with at least one data block per encoded image frame, with at least one image of the sequence formatted into a plurality of data blocks, with the stored sequence of data blocks including additional data blocks, with each such additional data block identifying the storage device storage location of the first or only data block of the closest previously formatted intra-coded image frame, wherein the said additional data blocks are provided at fixed periodically repeated intervals within the stored sequence of encoded image data blocks .

7. A storage device as claimed in Claim 6, wherein the said additional data blocks are of a common size.

9. A storage device as claimed in Claim 6, carrying at respective separate storage locations auxiliary data associated with respective encoded image frames and each said additional data block further carries data identifying the storage device storage location of the auxiliary data

associated with the particularly indicated intra-coded image frame.

10. A storage device as claimed in Claim 6, in the form of an optical disc, wherein the said additional data blocks identify the location of the first or only data block of the closest preceding intra-coded image frame in terms of the location on disc at which said data block is stored.

11. An encoder apparatus comprising means for encoding successive images of a video image sequence according to a predetermined coding scheme in which some images of the sequence are intra-coded, without reference to any other image of the sequence, and the remainder are respectively coded with reference to at least one further image of the sequence;
means for formatting the encoded data for each image frame into one or a sequence of data blocks and outputting a data block stream formed of the data block or blocks from successive ones of the sequence of video images, said formatting including formatting at least one image of the sequence into a plurality of data blocks, said means for formatting being operable to identify intra-coded frames, and being configured to insert additional data blocks in said data block stream, each of said additional data blocks carrying data identifying the relative location in the data block stream of the first or only data block of the closest previously formatted intra-coded image frame, wherein each of said additional data blocks are provided at fixed periodically repeated intervals within the stored sequence of encoded image data blocks .

12. A video image player configured to receive and read the sequence of data blocks from a sequentially-readable storage device, said storage device capable of being sequential read and carrying an encoded and formatted sequence of video image, wherein some images of the sequence are intra-coded, without reference to any other image of the sequence, and the remainder are respectively coded with reference to at least one further image of the sequence, and the

encoded data for the succession of image frames is formatted into a sequence of data blocks, with at least one data block per encoded image frame, with at least one image of the sequence formatted into a plurality of data blocks, with the stored sequence of data blocks including additional data blocks, with each such additional data block identifying the storage device storage location of the first or only data block of the closest previously formatted intra-coded image frame, said player comprising a decoder arranged to receive the stream of data blocks, decode the image data and output a sequence of video image frames, said player being operable to output selected ones of said sequence in a fast-forward or fast reverse mode, the player comprising means for selecting frames by selecting every N^{th} additional data block and displaying the respectively identified intra-coded image frame, wherein every N^{th} additional data block is provided at fixed periodically repeated intervals.

13. A method as claimed in claim 1, wherein at least one image of the sequence includes an intra-coded image frame.

14. A method as claimed in claim 1, wherein at least one image of the sequence includes a predicted image frame (P-frame).

15. A method as claimed in claim 1, wherein at least one image of the sequence includes an interpolated image frame (B-frame).

16. A device as claimed in claim 6, wherein at least one image of the sequence includes an intra-coded image frame.

17. A device as claimed in claim 6, wherein at least one image of the sequence includes a

predicted image frame (P-frame).

18. A as device claimed in claim 6, wherein at least one image of the sequence includes an interpolated image frame (B-frame).

19. An apparatus as claimed in claim 11, wherein at least one image of the sequence includes an intra-coded image frame.

20. An apparatus as claimed in claim 11, wherein at least one image of the sequence includes a predicted image frame (P-frame).

21. An apparatus as claimed in claim 11, wherein at least one image of the sequence includes an interpolated image frame (B-frame).

22. A method as claimed in Claim 1, wherein said encoding comprises encoding at a variable compression rate.